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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES****On Appeal to the Board of
Appeals and Interferences**

Appellant(s) : Rolf Hartung Examiner: James W. Keenan
Serial No. : 10/030,532 Group Art Unit: 3652
Filed : May 20, 2002
Title : Handling System

APPEAL BRIEF

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December 17, 2007

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37,952

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NY02:606254.1

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Serial No. :	10/030,532	Group Art Unit: 3562
Filed :	May 20, 2002	
Title :	Handling System	

APPEAL BRIEF

Commissioner for Patents
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is filed in response to a Notice of Panel Decision for Pre Appeal Brief Review mailed on November 8, 2007, which decision is to proceed to Board of Patent Appeals.

On October 9, 2006, Appellant filed a Reply To Office Action and a Notice of Appeal from the final rejection of twice-rejected claims contained in the Office Action dated August 2, 2006. The Notice of Appeal was received by the U.S. Patent and Trademark Office on October 13, 2006. An Appeal Brief was filed on December 13, 2006. A Notification of Non-

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Compliant Appeal Brief was mailed by the U.S. Patent and Trademark Office on February 28, 2007.

An Amended Appeal Brief was filed on March 28, 2007 following which prosecution was reopened. In an Office Action dated July 19, 2007, claims 17, 18, 21, 22, 25, 26, 28 and 31 were again rejected. Appellants filed an Pre-Appeal Brief Request for Review on October 17, 2007 leading to the aforementioned Notice of Panel Decision for Pre Appeal Brief Review.

The fee for this Appeal, as set forth in 37 C.F.R. §41.20(b) (2), was previously paid at the time of filing of Appellants' original Appeal Brief on December 13, 2006

Appellant hereby timely submit, pursuant to 37 C.F.R. § 41.37, an Appeal Brief in support of the appeal of the rejection of pending claims 17, 18 and 21, 22, 25, 26, 28 and 31.

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I. REAL PARTY IN INTEREST

The real party in interest is CENTROTHERM CLEAN SOLUTIONS GMBH +CO. KG (hereinafter "CENTROTHERM"), having its principal place of business at Johannes-Schmid-Strasse 8, D-89143 Blaubeuren, Germany, is the assignee of the entire right, title, and interest in the present application by way of Assignment dated September 29, 2006 recorded on October 26, 2006 at Reel 018452, Frame 0873 and Assignment dated May 6, 2002 recorded on May 20, 2002 at Reel 012917, Frame 0946.

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II. RELATED APPEALS AND INTERFERENCES

None.

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III. STATUS OF CLAIMS

Claims 1-16, 19, 20, 23, 24, 27, 29 and 30 are cancelled.

Claims 17, 18 and 21, 22, 25, 26, 28 and 31 presently stand finally rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

Further, Claims 17, 18 and 21, 22, 25, 26, 28 and 31 presently stand rejected under 35 U.S.C. 103(a) as being obvious from Parodi et al. U.S. Patent No. 5,651,823 ("Parodi") in view of Yonemizu et al. U.S. Patent No. 5,958,145 ("Yonemizu") and Saraoka et al. U.S. Patent No. 5,855,726 ("Saraoka").

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IV. STATUS OF AMENDMENTS

Specification

Appellants submitted an Amendment[s] to the Specification (i.e. to specification ¶ [0021]) in a Reply dated December 21, 2005. In Office Actions dated February 28, 2006 August 2, 2006, and July 19, 2007, the Amendment[s] to the Specification dated December 21, 2005 were objected to under 35 U.S.C. § 132(a) as introducing new matter and a requirement to cancel imposed.

Claims

No claim amendments have been submitted or await entry after the Office Action of July 19, 2007.

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V. SUMMARY OF CLAIMED SUBJECT MATTER

Appellant's invention relates to the apparatus for transfer of wafers in or out of vacuum processing chambers. Vacuum processing chambers are understood in the art to be "fully walled" chambers or enclosures. Access to the vacuum processing environment requires opening and closing of a door or chamber entrance. (See e.g., Specification ¶ [0002] paragraph line 6- end, [0007] paragraph lines 1-3, and [0009] paragraph lines 1-3, ¶ [0023] paragraph lines 6-8, etc.).

The invention provides an integrated apparatus integrating a wafer processing vacuum chamber and means for transferring wafers from a wafer-holding cassette into the wafer processing vacuum chamber and between hot "processing" plates and cold "resting" plates in the vacuum chamber. The integrated apparatus includes a first handler external to the vacuum processing chamber and a second handler internal to the vacuum-processing chamber. The first handler transfers wafers between the external cassette and into the vacuum chamber. The second handler inside the vacuum processing chamber is configured to receive wafers transferred from outside the vacuum processing chamber by external handler, and to move such wafers in the vacuum chamber (e.g., between the hot and cold plates in the vacuum chamber).

The elements of claim 17 include an internal handler, which is "disposed in . . . the vacuum chamber," and which is configured "to interact with said grippers [of the handler external to the vacuum chamber] to receive a wafer therefrom." Further, the internal and external handlers are configured to move the wafers "from the wafer cassette through the cooling and heating plates," (as shown in FIGS. 1 and 2 substantially along an imaginary linear axis which is parallel to the transverse elements 11 and passing above the centers of plates 8 and 4).

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A listing and mapping of the elements of claim 17 to the specification is as follows:

17. An apparatus for handling wafers [See e.g., *specification FIG. 1*], wherein the apparatus is configured to place said wafers from a wafer-holding cassette [See e.g., *specification ¶ [0022] paragraph line 2*] disposed on a loading station [See e.g., *specification ¶ [0023] paragraph line 1, FIG. 1 element 1*], into a wafer processing vacuum chamber [See e.g., *specification ¶ [0024] paragraph lines 1-2, FIG. 1 element 6*], and wherein said wafer processing vacuum chamber has a wafer holding device [See e.g., *specification ¶ [00243] paragraph line 2, FIG. 1 element 9*] including a cooling plate and a heating plate [See e.g., *specification ¶ [0023] paragraph lines 2, FIG. 1 element 7 and 8*], the apparatus for handling wafers comprising:

an external handling device [See e.g., *specification ¶ [0023] paragraph line 2, FIG. 1 element 2*], having grippers [See e.g., *specification ¶ [0023] paragraph line 4*], for transferring said wafers between said cassette and said wafer processing vacuum chamber, wherein said external handling device is disposed in front of said wafer processing vacuum chamber [See e.g., *specification ¶ [0037] paragraph line 1, ¶ [0043] paragraph line 1, specification page 9 "rear wall 14", and FIG. 1*]; and

an internal handling device [See e.g., *specification ¶ [0024] paragraph line 2, FIG. 1 element 9*], disposed within said wafer processing vacuum chamber and is provided with a transverse guide [See e.g., *specification ¶ [0025] paragraph line 4, FIGS. 1 and 2 element 11*], said internal handling device having at least one fork [See e.g., *specification ¶ [0024] paragraph line 3, FIGS. 1 and 2 element 10*], arranged in a mount [See e.g., *specification ¶ [0025] paragraph line 4, FIGS. 1 and 2 element 11*], on said transverse guide to move with at least two

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degrees of freedom [See e.g., *Specification ¶ [0025] paragraph line 4*] and arranged to interact with said grippers of said external handling device to receive a wafer therefrom [See e.g., *specification ¶ [0023] paragraph lines 6-8*], said fork being arranged to move said wafers between said cooling plate and said heating plate [See e.g., *specification ¶ [0023] paragraph lines 6-8*],

wherein said wafer-holding cassette disposed on a loading station is disposed in front of said vacuum chamber [See e.g., *specification ¶ [0023] and , FIGS. 1 element*], wherein said cooling plate and said heating plate are disposed one in front of the other in said vacuum chamber [See e.g., *specification ¶ [0031] paragraph line 4*], and wherein said internal and external handling devices are configured to move said wafers from said wafer holding cassette in front of the vacuum chamber [See e.g., *specification ¶ [0040] paragraph lines 1-3*], to the said cooling plate and said heating plate in said vacuum chamber and back [See e.g., *specification ¶ [0023] paragraph line 4, FIGS. 1 and 2 element 11*], and wherein said chamber and said external handling device are surrounded by an enclosure [See e.g., *specification ¶ [0019] paragraph lines 1-4, and FIG. 1 element 3*].

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VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

- a. The final rejection of claims 17, 18, 21, 22, 25, 26, 28 and 31, under 35 U.S.C. 112, second paragraph, allegedly as being indefinite.
- b. The more that twice rejection of claims 17, 18, 21, 22, 25, 26, 28 and 31, under 35 U.S.C. 103(a), allegedly as being obvious from Parodi et al. U.S. Patent No. 5,651,823 ("Parodi") in view of Yonemizu et al. U.S. Patent No. 5,958,145 ("Yonemizu") and U.S. Patent No. 5,855,726 ("Saraoka").

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VII. ARGUMENT**a. § 112 rejection**

The Office Action improperly rejects claims 17, 18 and 21, 22, 25, 26, 28 and 31 under 35 U.S.C. 112, second paragraph, allegedly as being indefinite.

With respect to claim 17 line 8, appellant notes that in common English usage the phrase “in front of” in the context of line 8 is readily understood without ambiguity to mean “facing someone or something.” The undersigned has confirmed this understanding of common English usage in the public domain as indicated at page 8 of Appellant’s after-final Reply filed concurrently with the Notice of Appeal on October 9, 2006. The specification at page 9 and FIG. 1 make reference to a rear wall 14 and provide direction to the claimed apparatus. Further, the specification ¶¶ [0031], [0037] and [[0040] make reference to “front”, providing a direction or orientation of to the claimed apparatus to reader. Further, appellant notes that the specification ¶ [0034], for example, describes a wafer handler which may be disposed on the rear or back end of the chamber “for removal of the product [] the rear wall 14 of the processing chamber 6.” The words rear and back end provide a directional or orientational reference.

However, appellant does not believe that it is necessary to pre-define particular sides to the chamber to impart clear meaning to the phrase “in front of” as used in claim 17. Any side or all sides of the subject chamber are within the meaning of the phrase “in front of” taken to mean “facing someone or something.”

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However, to expedite prosecution, appellant has, without prejudice, in the after final Reply dated October 9, 2006 proposed to amend claim 17 to replace the word "front" with the word "outside".

With respect to claim 17 line 10, appellant notes that "transverse guide" refers to transverse guide (11), which has been adequately defined in the specification and identified in the figures. (See e.g., Specification ¶ [0011] paragraph line 2, ¶ [0025] paragraph lines 2-4, FIGS. 1 and 2, etc.). FIG. 1, for example, shows guide 11 is transverse (i.e., transverse: lying or extending across) the wafer processing vacuum chamber.

In the after final Reply dated October 9, 2006, appellant has proposed amended claim 17 to include the reference numeral 11 after the term "transverse guide" to avoid any confusion.

With respect to claim 17 line 11, appellant notes that the fork can move up and down relative to the mount (first degree of freedom), and back and forth with the mount (i.e., second degree of freedom). The fork and mount arrangement is configured to move said fork up/down and back/forth (i.e., to move said fork with at least two degrees of freedom," as recited in the claim). (See e.g., Specification ¶ [0025] paragraph line 4: "move vertically and laterally," etc.).

Appellant respectfully submits that the claims conform to all § 112 requirements.

The § 112 rejection is incorrect and should be reversed.

b. § 103(a) rejection

The Office Action improperly rejects claims 17, 18 and 21, 22, 25, 26, 28 and 31 under 35 U.S.C. 103(a) allegedly as being obvious from Parodi in view of Yonemizu and Saraoka.

Independent claim 17 reads as follows:

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17. An apparatus for handling wafers [See e.g., specification FIG. 1], wherein the apparatus is configured to place said wafers from a wafer-holding cassette [See e.g., specification ¶ [0022] paragraph line 2] disposed on a loading station [See e.g., specification ¶ [0023] paragraph line 1, FIG. 1 element 1], into a wafer processing vacuum chamber [See e.g., specification ¶ [0024] paragraph lines 1-2, FIG. 1 element 6], and wherein said wafer processing vacuum chamber has a wafer holding device [See e.g., specification ¶ [00243] paragraph line 2, FIG. 1 element 9] including a cooling plate and a heating plate [See e.g., specification ¶ [0023] paragraph lines 2, FIG. 1 element 7 and 8], the apparatus for handling wafers comprising:

an external handling device [See e.g., specification ¶ [0023] paragraph line 2, FIG. 1 element 2], having grippers [See e.g., specification ¶ [0023] paragraph line 4], for transferring said wafers between said cassette and said wafer processing vacuum chamber, wherein said external handling device is disposed in front of said wafer processing vacuum chamber [See e.g., specification ¶ [0037] paragraph line 1, ¶ [0043] paragraph line 1, specification page 9 "rear wall 14", and FIG. 1]; and

an internal handling device [See e.g., specification ¶ [0024] paragraph line 2, FIG. 1 element 9], disposed within said wafer processing vacuum chamber and is provided with a transverse guide [See e.g., specification ¶ [0025] paragraph line 4, FIGS. 1 and 2 element 11], said internal handling device having at least one fork [See e.g., specification ¶ [0024] paragraph line 3, FIGS. 1 and 2 element 10], arranged in a mount [See e.g., specification ¶ [0025] paragraph line 4, FIGS. 1 and 2 element 11], on said transverse guide to move with at least two degrees of freedom [See e.g., Specification ¶ [0025] paragraph line 4] and arranged to interact

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with said grippers of said external handling device to receive a wafer therefrom [See e.g., *specification ¶ [0023] paragraph lines 6-8*], said fork being arranged to move said wafers between said cooling plate and said heating plate [See e.g., *specification ¶ [0023] paragraph lines 6-8*],

wherein said wafer-holding cassette disposed on a loading station is disposed in front of said vacuum chamber [See e.g., *specification ¶ [0023] and, FIGS. 1 element*], wherein said cooling plate and said heating plate are disposed one in front of the other in said vacuum chamber [See e.g., *specification ¶ [0031] paragraph line 4*], and wherein said internal and external handling devices are configured to move said wafers from said wafer holding cassette in front of the vacuum chamber [See e.g., *specification ¶ [0040] paragraph lines 1-3*], to the said cooling plate and said heating plate in said vacuum chamber and back [See e.g., *specification ¶ [0023] paragraph line 4, FIGS. 1 and 2 element 11*], and wherein said chamber and said external handling device are surrounded by an enclosure [See e.g., *specification ¶ [0019] paragraph lines 1-4, and FIG. 1 element 3*].

Thus, the elements of claim 17 include:

- a) a processing vacuum chamber;
- b) an external handling device . . . “disposed in front of [outside] the wafer processing vacuum chamber;”
- c) an internal handling device “disposed within said wafer processing vacuum chamber,” “[w]herein said internal and external handling devices are configured to move said wafers from said wafer holding cassette in front of the vacuum chamber to the

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said cooling plate and said heating plate in[to] said vacuum chamber and back; and

d) an enclosure surrounding "said [processing vacuum] chamber and said external handling device."

Appellant respectfully submits that these elements of claims 17 are not shown by the cited references — Parodi, Yonemuzi, and Saraoka even when they are viewed in combination.

Neither Parodi, Yonemuzi nor Saraoka, individually or in combination, disclose all of the elements of claim 17:

(a) an external handling device disposed in front of ["outside"] the wafer processing vacuum chamber,"

(b) an internal handling device disposed "within the vacuum chamber," and which is coupled to the external handling device "to move said wafers from [] in front of the vacuum chamber to the said cooling plate and said heating plate in said vacuum chamber and back,"

and

(c) a [common] enclosure] surrounding "said [vacuum] chamber [which has the internal handling device] and said external handling device."

In Parodi, heating/cooling unit 17, wafer-handling device 13 (and likewise wafer handling device 208, wafer handling robot 13, I/O cassettes 19 and 20, coating unit 21, etc.) all are inside a single atmospheric pressure system 10/coating section 11. Parodi at most teaches a configuration of internal wafer handlers in an atmospheric pressure processing chamber.

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Thus, unlike appellant's claims, Parodi does not show, teach or suggest an internal handling device disposed "within the vacuum chamber," and which is coupled to the external handling device "to move said wafers from [] in front of the vacuum processing chamber."

Yonemizu shows a substrate washing apparatus having a handling device with a fork and two degrees of freedom. However, Yonemizu's wafer handling system is entirely internal to the substrate washing apparatus. (See Yonemuzi, col. 2 lines 25-29, and lines 40-44).

Like Parodi, Yonemuzi does not show, teach, or suggest and "internal handling device disposed "within the vacuum chamber," and which is coupled to the external handling device "to move said wafers from [] in front of the vacuum processing chamber," as required by appellant's claim 17.

Appellant has previously noted, like Parodi, Yonemizu's "washing" apparatus is an atmospheric pressure apparatus for which there is no motivation to convert to a vacuum processing environment. The use of washing liquids in Yonemizu's apparatus teaches away from a vacuum processing chamber.

The Office Action now cites Soraoka as an example of a vacuum processing chamber. "Soraoka shows a vacuum processing apparatus for wafers including an enclosure 100, cassette loading station 16, and internal handling device 10 and vacuum processing chambers 6, and 7." (See Office Action, page 5 1st complete paragraph).

However, Soraoka does not overcome the deficiencies of Parodi and Yonemuzi. Appellant notes that Soraoka describes an external atmospheric loading robot 9, which moves wafers in and out of intermediary loading stations (load locks) 4 and 5. Internal handling device

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10 picks up wafers from loading station 4 for vacuum processing and drops off wafers at loading station 5 after vacuum processing. (See e.g., Soraoka, Fig. 2, col. 5 line 62 - col. 6 line 23, etc.).

Thus, like Parodi and Yonemuzi, Soraoka fails to show, teach or suggest an “outside” wafer handling system to introduce wafers in a vacuum wafer processing chamber, which is further coupled to an “inside” wafer handling system to move wafers in the processing chamber.

Therefore, claim 17 and its dependent claims are patentable over the combination of the cited references.

Appellant additionally notes that the Office Action (page 5, 2nd complete paragraph) mischaracterizes and misapplies known clean room technology by noting “it is extremely well known . . . to process wafers in a clean room environment” and therefore “one would surround the critical components of the system to ensure cleanliness.” Appellant notes enclosing system components may keep dirt out but does not ensure that dirt is not generated by the system components or processes themselves. In any case, cleanliness or clean room processing is not the focus of appellant’s invention or claims.

Further, the Office Action (page 6, 1st complete paragraph) confuses vacuum processing with “various types of processing, including rinsing (i.e. washing).” Appellant respectfully submits, as is well known in the art, “rinsing and washing” are atmospheric pressure processes involving water or other fluids incompatible with vacuum processing.

For at least the foregoing reasons, claim 17 is non-obvious and patentable over the combination of Parodi, Yonemuzi and Soraoka.

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VIII. CLAIMS APPENDIX

The rejection of the following (non-cancelled) claims 17, 18 and 21, 22, 25, 26, 28 and 31, is appealed.

1. - 16. (Cancelled)

17. An apparatus for handling wafers, wherein the apparatus is configured to place said wafers from a wafer-holding cassette disposed on a loading station into a wafer processing vacuum chamber, and wherein said wafer processing vacuum chamber has a wafer holding device including a cooling plate and a heating plate, the apparatus for handling wafers comprising:

an external handling device having grippers for transferring said wafers between said cassette and said wafer processing vacuum chamber, wherein said external handling device is disposed in front of said wafer processing vacuum chamber; and

an internal handling device disposed within said wafer processing vacuum chamber and is provided with a transverse guide, said internal handling device having at least one fork arranged in a mount on said transverse guide to move with at least two degrees of freedom and arranged to interact with said grippers of said external handling device to receive a wafer therefrom, said fork being arranged to move said wafers between said cooling plate and said heating plate, wherein said wafer-holding cassette disposed on a loading station is disposed in front of said vacuum chamber, wherein said cooling plate and said heating plate are disposed one in front of the other in said vacuum chamber, and wherein said internal and external handling devices are configured to move said wafers from said wafer holding cassette in front of the vacuum chamber

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to the said cooling plate and said heating plate in said vacuum chamber and back, and wherein said chamber and said external handling device are surrounded by an enclosure.

18. Apparatus as specified in claim 17 wherein said fork is arranged to be movable under a placement location for said wafers on said wafer holding device.

19. (cancelled)

20. (cancelled)

21. Apparatus as specified in claim 17 wherein there is provided a cooling device for cooling said internal handling device.

22. Apparatus as specified in claim 17 wherein there are provided multiple heating and cooling plates arranged in a stack in said chamber.

25. Apparatus as specified in claim 17 wherein said fork is arranged to be preheated.

26. Apparatus as specified in claim 25 wherein said fork is arranged to contact said heating plate for said preheating.

27. (Cancelled)

28. Apparatus as specified in claim 17 wherein there are provided multiple chambers arranged in a stack.

29. (Cancelled)

30. (Cancelled)

31. Apparatus as specified in claim 17 wherein said enclosure is purged by gas at a low overpressure.

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VIII. SPECIFICATION APPENDIX

The following Amendment to ¶ [0021] of the specification was submitted by appellant in the Reply dated 12/21/2005:

Please amend paragraph [0021] on page 5 of the specification (under the section heading "Brief Description of the Drawings") as follows.

[0021] Fig. 1 is a simplified representation of a workstation including a processing chamber in accordance with an embodiment of the invention with an internal handling system. The workstation has a loading station in the front of the processing chamber for receiving a wafer cassette. The processing chamber has a cooling plate and a heating plate one in front of the other. Fig. 1 shows that the cooling plate, heating plate and the loading station for receiving a wafer cassette may be disposed one in front of the other about a linear axis (e.g., substantially parallel to the rails of the internal handling system).

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IX. EVIDENCE APPENDIX

None.

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X, RELATED PROCEEDINGS APPENDIX

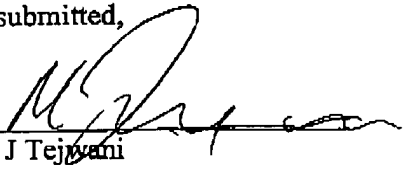
None.

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For the foregoing reasons, the Examiner' rejection of claims 17, 18 and 21, 22, 25, 26, 28 and 31 should be reversed.

Respectfully submitted,

Dated: December 17, 2007

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